Early Stroke Detection Assist Goggle

AI & ML diagnostic system

Jim Huang, Designer, Co-founder | Dec. 13, 2018
Neurobit Technologies

IoT Healthcare with AI
Biomedical Innovation

Physicians

Clinical Problems

Solutions
Design, Engineering, Formulas, Service, Commercialization...

Multi-disciplinary
Students, Researchers, Designers, Practitioners
Biomedical Innovation & Commercialization – 2015 in NTU

Proof of Concepts
Various Competition – 2016 Team Building

Key member Joined Potential Partners – 2016 Company Setup

50% Staff of Biomedical Specialty & Multidisciplinary Consultants

5 Global Hospitals Cooperation

2 Global R&D partners

Neurobit Technologies
About Stroke: A Serious Issue

#2
Leading cause of death and disability

5.7 Million
People die each year from stroke

$34 Billion
Social care and medicare cost
Medical Limitation: In Dizziness & Headache

Not easy to diagnose from various symptoms

How to find a better solution?

**Time**
- CT: Only 16% Sensitivity
  - $300/check
  - 30 mins/check (without pending)

**Space**
- MRI: 20% False negative
  - $1500/check
  - 1 hour/check when no pending

Current Scenario & Problems
Time Lost Is Brain Lost
Medical Device based on advancing guidelines

Which Could Really Save Some People

<table>
<thead>
<tr>
<th>Physical Exam</th>
<th>CT</th>
<th>MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Specificity</td>
<td>95%</td>
<td>98%</td>
</tr>
<tr>
<td>False positive rate</td>
<td>85%</td>
<td>86%</td>
</tr>
<tr>
<td>Check-up time</td>
<td>5-10 min</td>
<td>15-30 min</td>
</tr>
<tr>
<td>Cost per check</td>
<td>$10</td>
<td>$300</td>
</tr>
<tr>
<td>Remarks</td>
<td>Without any device</td>
<td>Risk of radiation exposure</td>
</tr>
</tbody>
</table>

For Cerebellum/hindbrain stroke
Prototype started from

Motion Camera

Glasses

Usability + Dimensions = Endless 3D prints
→ 100 patient data
Look Back

To help diagnosis **earlier and easier**

**Redesign**

**A Medical Device**

**For**

**Real And Relatable Scenario**
Redesign A Medical Device For Real And Relatable Scenario
light & portable  transparent  ultra-broad view
universal PD

medical-grade video

wireless capable

shading tests

guideline tests

quick analysis
Neurospeed Solution: Extending Clinical Scenarios

For Emergency Medicine, 2018

Head Impulse, Nystagmus, Test of Skew

H.I.N.T.S. fits multiple indexes of National Institute of Health Stroke Scale (NIHSS)

US10026169B2
I616188
Filed: CN/EPO
Early Detection & Prevention

AI Integrated Hardware & Software

- **No Risk**
  - Healthy

- **Low Risk**
  - Vestibular Neuritis
  - Meniere's Disease
  - BPPV

- **High Risk**
  - Brain Tumors
  - Brain Stroke
  - Multiple Sclerosis

Peripheral

Central
According to doctors

Normal and Pathological Nystagmus Types
Project Asclepius Titan

- 200 pcs up
- Provide Goggles to Clinics
- Hardware Production

- 300,000 cases
- Collect Big Data
- Channel Promotion

- 3~6 Types
- Rapid Screening
- Enormous Dataset

\[ f_1(x) \quad f_2(y) \quad f_3(z) \ldots \]
Standardized Devices
For Near-eye Examination & Recording
In Hospital Divisions
Prototype Demo
Use for Time saving & Data sharing

Portable / Rapid screening / Diagnostic device for brain diseases

- Prevention
- Screening
- Classification
- Monitoring

Patients Pending
5 Advantages
Why “IoT” empowers us

Sharable data*, organized telemedicine

Easy data transformation

Frontier nystagmo-research

Up-to-date system for state-of-art functions

Adaptability of Regulation in time

*Refers to meaningful anonymous social history data for associated case studies
After: Impact

- 2% Cancers from *Excess CT Scans* can be Reduced
- 100,000 Misdiagnosed Strokes can be Prevented
- $1 billion Annual *Healthcare* Savings
From “Micro Eye Movement” (Nystagmus) to Brain

Symptom Recording
- Pre- & Post-surgery check
- General Exams
- Special Exams

Divisional use
- Neurology, Emergency, ENT, Ophthalmology, Family Medicine
- Rapid Screening of Stroke and Brain Diseases
- Classification

Standardization
- Inheritance of medical education
- Common language for thesis
- AI database established for prediction
歡迎合作
Thank You